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SOIL-WASHING APPARATUS AND METHODS USED IN COUNTING WIREWORM EGGS

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Insect Investigations 1/

The difficulties encountered in separating wireworm eggs from large field-collected samples of soil have necessitated certain changes in the apparatus and methods employed in studies dealing with the egg and early larval stages of this insect. It is believed that the soil-washing apparatus described herein represents an improvement over that previously used and reported upon. 2/

The washer has a wooden framework, 4 feet in height, which supports the 3 sieves used. Funnels (fig. 1) attached to this framework collect the run-off which passes through each sieve, discharging it onto successively finer sieves below (fig. 2). The vertical spacing between sieves is 15 inches. This arrangement of sieves results in a rapid washing action, with less tendency for the screens to clog than where all sieves are placed one directly beneath another. Moreover, the turbid water strikes the middle and bottom sieves at an angle, thus reducing the tendency to splash. Also, the open arrangement makes it easy to spray additional clear water onto any sieve which threatens to clog, and facilitates the removal of the sieves when the washing operation is completed.

In using the washer the sample of soil is placed in the tub which rests on the frame, and the tub is filled nearly full of water. The mixture is thoroughly stirred, care being taken to mash and dissolve all the clods. When the mixture is well stirred and has the maximum quantity of soil in suspension it is released onto the coarse top screen by pushing the cork out of a 2-inch opening in the bottom of the tub. Stirring is continued while the mixture drains. Additional clear water is sprayed first on one screen and then on another, wherever the need for additional dilution and flushing is greatest. The debris remaining on the screens is washed with clear water and then removed from the sieves and examined.

1/ Acknowledgement is made of the assistance rendered by F. C. Albertson, of the Parma, Idaho, field laboratory of the Bureau of Entomology and Plant Quarantine, who aided in the construction of the soil washer.

2/ Shirck, F. H., A Soil-Washing Device for Use in Wireworm Investigations. Jour. Econ. Ent. 23: 991-994, illus. 1930.

The number and size of the sieves and the mesh sizes of the screen cloth used can be varied to suit the particular requirements of the investigator. In the work with wireworm eggs it was found that sieves measuring 14 by 18 by 2½ inches, inside dimensions, were of satisfactory size. The frames of the sieves are made of white pine and they were treated with hot linseed oil before being placed in use. These frames are fastened together with screws at the corners, and the copper screen cloth is held in place by a light wooden bat nailed to the bottom edge of each sieve. The following screen mesh sizes are used in the respective sieves: top sieve, 12 meshes to the linear inch; middle sieve, 24 meshes to the linear inch; bottom sieve. 40 meshes to the linear inch.

The wireworm eggs pass through the first two sieves and are recovered from the debris left on the bottom sieve. This debris is placed in a pan having a 40-mesh screen bottom, and the pan is then lowered into another pan containing a saturated solution of sodium chloride. The eggs, together with much debris light enough to float, are then skimmed from the surface of the brine with the skimmer shown on the stand of the binocular in figure 3. Only a thin layer of debris is collected at one time so that the layer will not be deep enough to cover completely any wireworm eggs contained therein. Number 30 tinned iron wires, spaced one-half inch apart, are soldered to the top edge of the skimmer. This divides the skimmer into fields of convenient width, making possible the rapid and accurate examination of the debris under the binoculars.

If time does not permit the examination of all the material at the time of washing, it may be stored in a preservative solution and examined later, provided, of course, that the needs of the investigation do not require that the insects or eggs contained therein be kept alive. In the work with wireworm eggs it was found that a 4-percent solution of carbolic acid served satisfactorily as a preservative. The eggs that had been placed in this preservative were dead white, in contrast to their natural pearly color, and were therefore easier to detect after being stored in the carbolic acid solution.

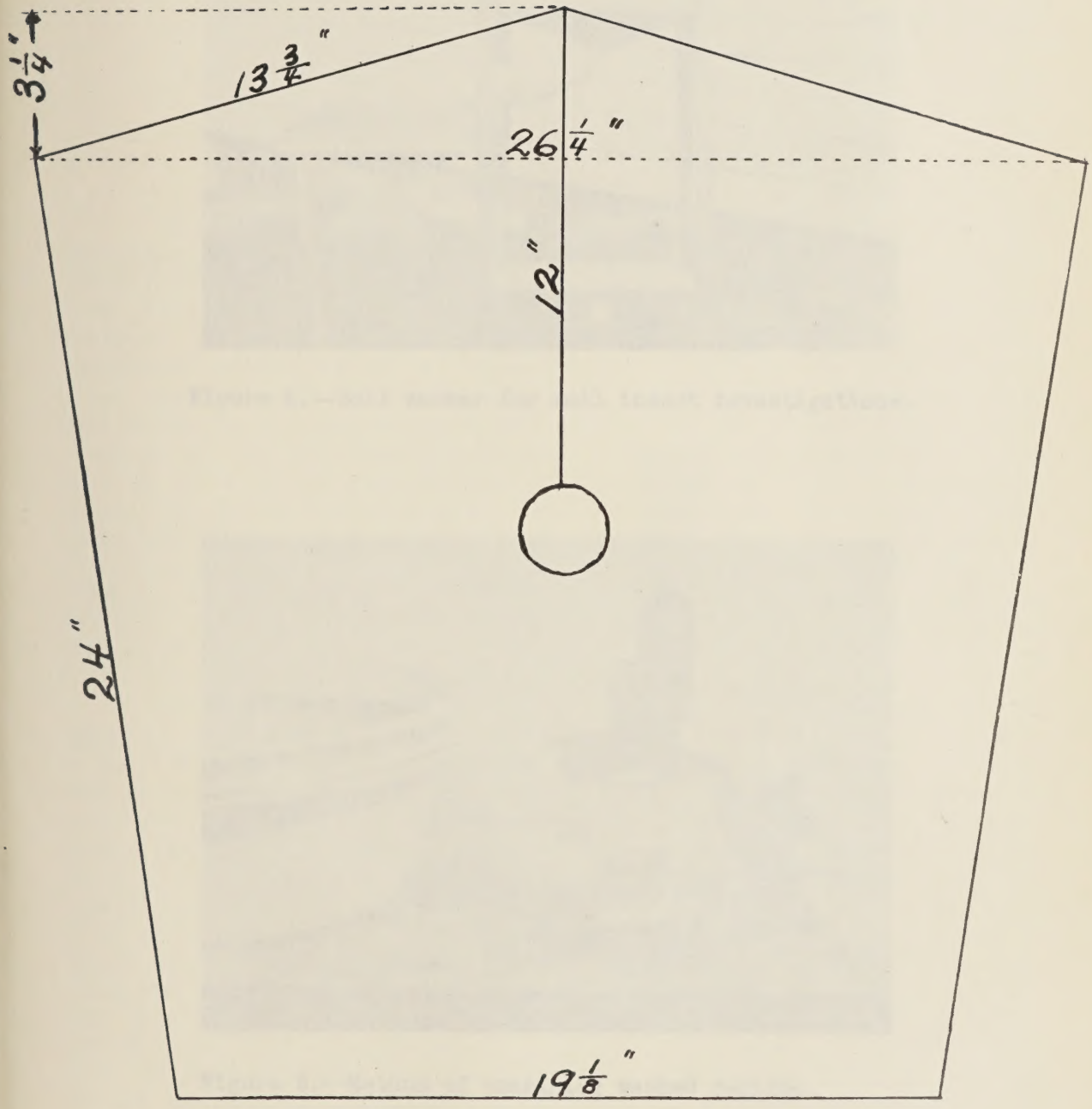

Figure 1.--Pattern for sheet metal funnels.

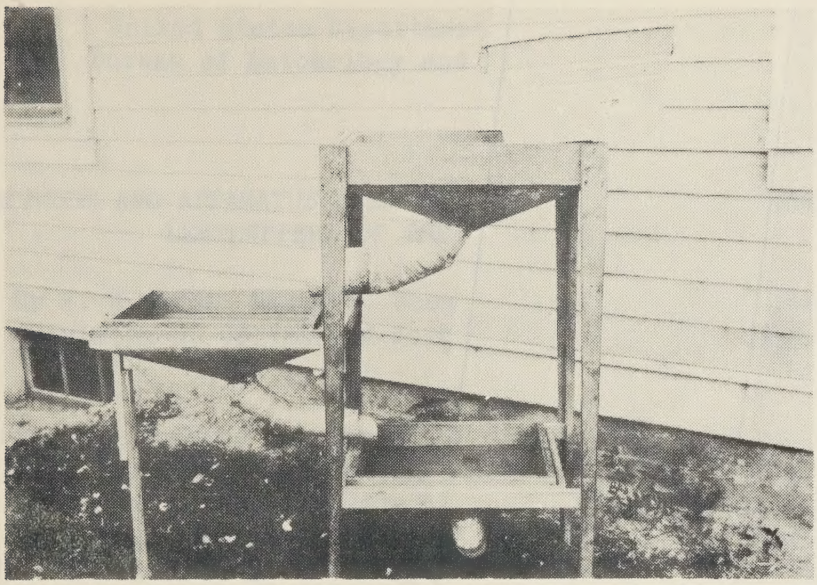

Figure 2.--Soil washer for soil insect investigations.

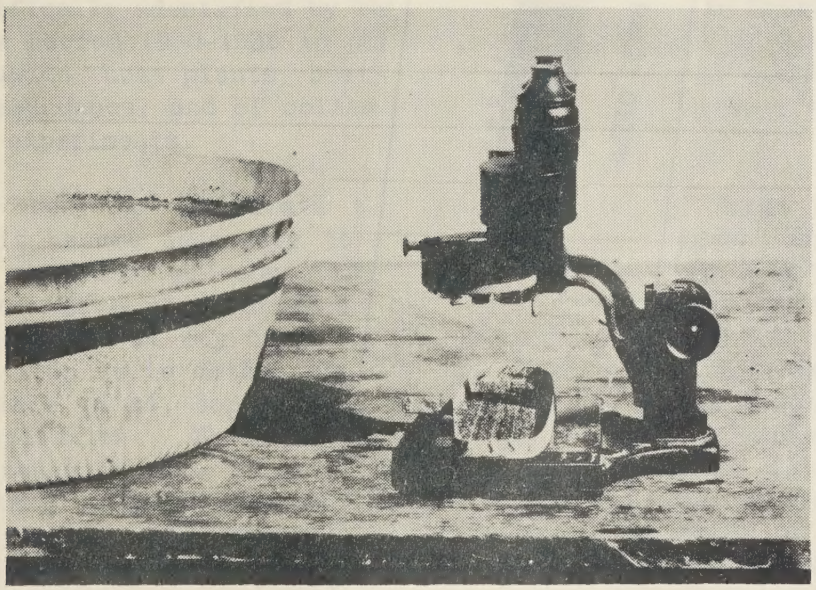

Figure 3.--Method of examining washed residue.